ILLINOIS

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

PRODUCTION NOTE

University of Illinois at
Urbana-Champaign Library
Large-scale Digitization Project, 2007.

Population status of the Illinois chorus frog (*Pseudacris streckeri illinoensis*) in Madison County, Illinois: Results of 2003 surveys

IDOT CONTRACT 1-5-90179

FINAL REPORT ON 2003 RESULTS

John K. Tucker

Center for Aquatic Ecology

Illinois Natural History Survey

Great Rivers Field Station

8450 Montclaire Avenue

Brighton, Illinois 62012

January 2004

J. K. Tucker

Principal Investigator

Center for Aquatic Ecology

Illinois Natural History Survey

DISCLAIMER

The findings, conclusions, and views expressed herein are those of the researchers and should not be considered as the official position of the Illinois Department of Transportation.

ACKNOWLEDGMENT OF SUPPORT

This research (contract number 1-5-90179) was funded by the Illinois Department of Transportation.

EXECUTIVE SUMMARY

A study of the biology of the Illinois chorus frog, *Pseudacris streckeri illinoensis*, is reported. Surveys of Madison County for choruses of the frogs located no choruses in 2003. These choruses were not active at the same sites that choruses were found in 2002. The bulk of the study was conducted using drift fences at the wetland mitigation area adjacent to Sand Road in Sec. 19, T4N, R8W. The primary purpose of the 2002 study was to examine spatial variation in use of the mitigation area by the Illinois chorus frog and to estimate population size and density at the mitigation area. No estimates could be made for 2003 because only a single unmarked frog was caught at the study area. The lack of large (> 3 cm) rainfall events likely explain the inactivity. Frogs were not heard calling at other study sites as well.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGMENTS

L. E. Brown provided many useful suggestions concerning the biology of the frog and helped with literature needs. G. E. Kruse provided permits necessary for this project.

INTRODUCTION

The Illinois chorus frog, *Pseudacris streckeri illinoensis*, is restricted to the floodplains of the Mississippi and Illinois rivers in Arkansas, Illinois, and Missouri (Conant and Collins, 1991). The frog is listed as a threatened species in Illinois (Herkert, 1992), as a rare species in Missouri (Anonymous, 1992), as a species of special concern in Arkansas (R. Roberg, pers. comm.), and as federal C-2 species (Dodd et al., 1985).

This highly fossorial frog occurs in Illinois mainly along the central part of the Illinois River (Smith, 1951, 1961, 1966; Morris and Smith, 1981; Taubert et al., 1982; Brown and Rose, 1988; Morris, 1990; Beltz, 1991 and 1993). Other populations are, also, scattered along the Mississippi River from Madison to Alexander Counties, Illinois (Holman et al., 1964; Brown and Brown, 1973; Axtell and Haskell, 1977; Morris and Smith, 1981; Taubert et al., 1982; Gilbert, 1986; Brown and Rose, 1988; Morris, 1990; Beltz, 1991 and 1993; Tucker and Philipp, 1993; 1994; 1995; 1996).

Several previous publications and unpublished reports provide details on the life history of *P. s. illinoensis* including information on underground feeding behavior (Brown, 1978), burrowing behavior (Axtell and Haskell, 1977; Brown et al., 1972; Tucker et al., 1995; Tucker, 1995), chorus sites (Brown and Rose, 1988; Tucker, 1998), fecundity (Butterfield et al., 1989; Tucker and Philipp, 1995; Tucker, 1997a), post-metamorphic growth (Tucker, 1995; Tucker and Philipp, 1995), morphology of newly transformed froglets (Tucker, 1997b); food habits (Tucker, 1997c), thermobiology (Packard et al.. 1998), and

morphological adaptations to fossorial existence (Brown and Means, 1984; Paukstis and Brown, 1987 and 1991). The present report is a summary of results for 2002 and a continuation of studies initiated in 1993.

This year's activities carried forward objectives from previous years and include an analysis of the impact of the wetland mitigation area. My objectives were:

1. Monitor the distribution of *P. s. illinoensis* choruses in appropriate habitat in the impact area.
2. Estimate the approximate number of *P. s. illinoensis* located on the wetland mitigation area.

CHORUS LOCATIONS IN THE SAND ROAD STUDY AREA

MATERIALS AND METHODS

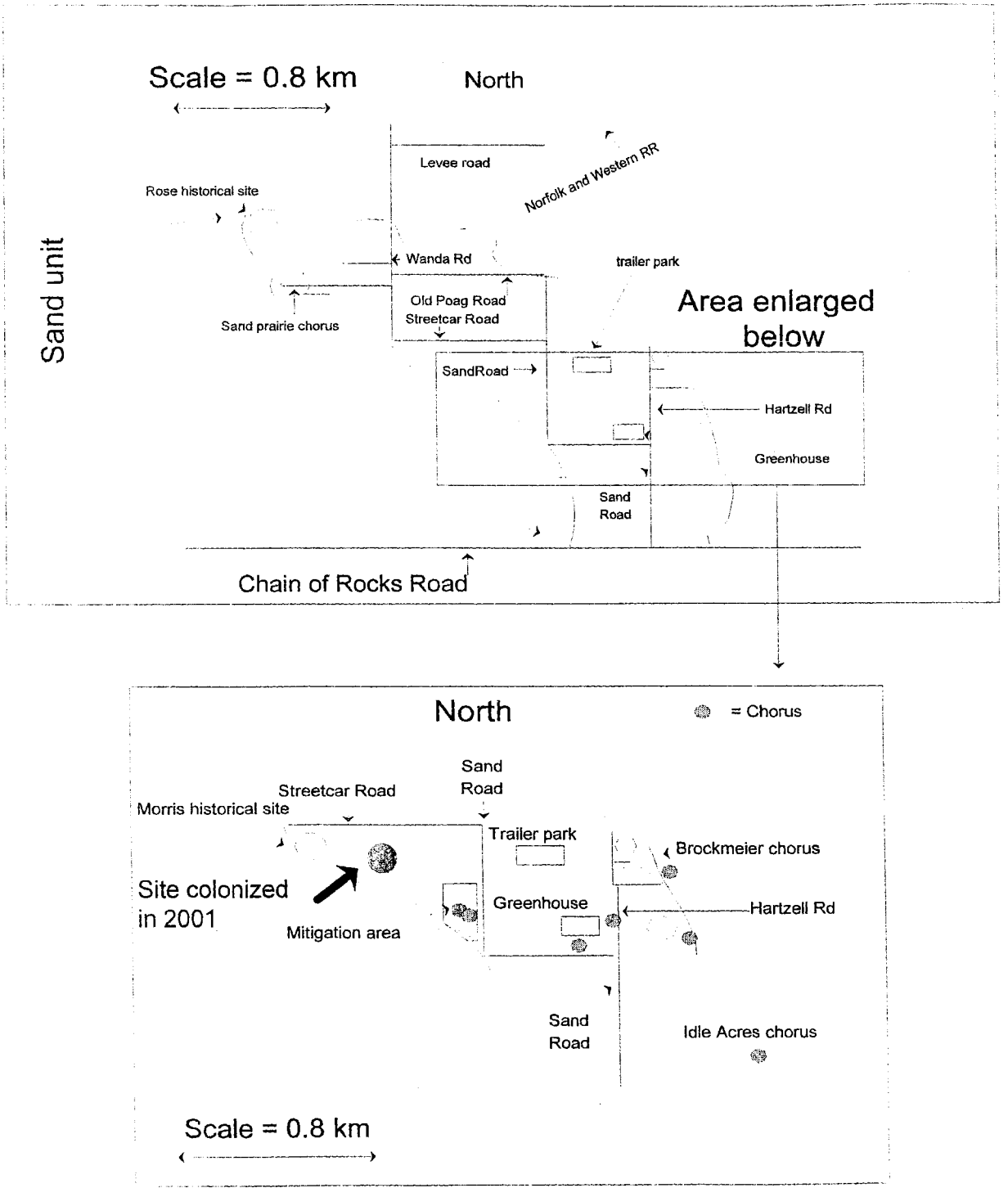
Monitoring of chorus locations in the Sand Road study area (Fig. 1) began on February 02, 2003. The methods used and sites visited were reviewed in previous reports (i.e., Tucker and Philipp, 1996).

RESULTS AND DISCUSSION

In 2003, no choruses were found. In contrast, in earlier years of the study, a total of nine choruses were located (Fig. 1). No new chorus sites were found in 2003.

Figure 1. Sand Road study area showing the location of the wetland mitigation area and known choruses of the Illinois chorus frog (*Pseudacris streckeri illinoensis*) in Madison County, Illinois.

Figure 1


Scale = 0.8 km
North
Levee road
Norfolk and Western RR
Rose historical site
Sand unit
Wanda Rd
trailer park
Old Poag Road
Streetcar Road
Sand prairie chorus
Area enlarged below
SandRoad
Hartzell Rd
Greenhouse
Sand Road
Chain of Rocks Road
North
= Chorus
Sand Road
Streetcar Road
Morris historical site
Trailer park
Brockmeier chorus
Site colonized in 2001
Greenhouse
Hartzell Rd
Mitigation area
Sand Road
Idle Acres chorus
Scale = 0.8 km

Generally, chorus sites have been stable in the general study area from 1994-2002 with no indication of decline. This year's results marked a departure from previous years results with the discovery of no chorus activity. The likely cause was lack of large rainfall events.

POPULATION SIZE ESTIMATES

MATERIALS AND METHODS

Population size estimate would have been computed using the Petersen method as modified by Bailey (1951) for estimates of population size when number of recaptures were small (Donnelly and Guyer, 1994). Standard error of was not calculated due to the small number of captures in 2000, 2001, 2002.

RESULTS AND DISCUSSION

Petersen estimate of population size was not possible in 2003. Only a single unmarked gravid female frog was captured in 2003. This frog was caught on May 12, 2003. Apparently the absence of large rainfall events kept frogs from attempting to travel to chorusing sites. A similar pattern was observed in 2000.

Table 1. Number of Illinois chorus frogs caught from 1996 to 2003.

Year	Total number of frogs	males	females
1996	60	31	29
1997	86	47	39
1998	22	13	9
1999	151	78	73
2000	2	0	2
2001	12	5	7
2002	47	24	23
2003	1	0	1

Summary

The restored wetland actually became available for the frogs to use in 1998. Coincidentally, 1997 was a severe drought year and the number of frogs caught in the following year (1998) was reduced by one-quarter in that compared to previous years. Despite this reduction, captures in 1999 were the highest ever made. These capture rates are not affected by collecting effort because the same drift fences have been used in all years of the study since 1996.

The 2003 year represents the lowest capture rate for any year of the study at the wetland mitigation area. 2003 was an extremely dry spring. Presumably that explains the lack of frog activity in 2003. The decreased activity of frogs was also noted in other Illinois populations including ones in Cass, Morgan, and Scott Counties.

The question that remains to be determined is "how successful is the wetland mitigation project in maintaining the Illinois chorus frog in Madison County?". This question cannot be fully answered at this time. One worrisome trend is apparent in the data collected to date. The lowest total numbers of frogs caught are all post-1999 (Table 1). The wetland actually became avaiable for the frogs to use in 1998 and possibly they were able to use it with extreme success, which is reflected in the high 1999 totals.

However, the wetland is also home for a number of potential frog tadpole predators including the tiger salamander (*Ambystoma tiginum*) and various fish. One possible hypothesis to explain low post-1999 frog numbers is that the wetland also allowed numbers of tiger salamanders to increase greatly. It is noteworthy that more than 300 salamanders were

caught transforming in 1999. The wetland provided a stable water source for these animals to complete their life cycle where one had not been present before. This is important because tiger salamanders need open water for about one month longer than does the Illinois chorus frog.

Fish are also another possible predator. The more persistent nature of the wetland may have contributed to fish success. Fish have been present in the wetland in all years except 2000. In that year the dry summer and fall allowed the wetland to completely dry out killing estabished fish populations. The fish "problem" is caused by repeated flooding from the County Ditch into the wetland.

Data collected (number of frogs caught/year-Table 1) does not support the conclusion that the wetland has been a success so far as the Illinois chorus frog is concerned. In fact, mean number of frogs caught from 2000-2003 is 15.5 frogs compared to an average of 56 frogs per year between 1996-1998. This would suggest that frog numbers have been reduced by 360% at the study site in post-1999 surveys.

The question remains as to why this apparent reduction in frog numbers has occurred. It could be that numbers just reflect poor spring weather in 2000 and 2003. It may also indicate that management strategy at the site needs to be reconsidered. Possibly draining the wetland by opening the gate on the berm on June 1 should to be contemplated. Allowing the wetland to dry down during June would greatly reduce salamander breeding success but not affect the Illinois chorus frog. Studies examining the number of salamanders at the site would also be indicated.

LITERATURE CITED

Anonymous. 1992. Rare and endangered species of Missouri Checklist. Missouri Department of Conservation, Jefferson City. 43 pp.

Axtell, R. W. and N. Haskell. 1977. An interhiatal population of *Pseudacris streckeri* from Illinois, with an assessment of its postglacial history. Chicago Acad. Sci. Nat. Hist. Misc. 202:1-8.

Bailey, N. T. J. 1951. On estimating the size of mobile populations from recapture data. Biometrica 38:293-306.

Beltz, E. 1991. Illinois chorus frog, *Pseudacris streckeri illinoensis*, 1991 survey of Cass, Menard, Morgan, and Scott Counites, Illinois. Unpublished report to Illinois Dept. Conservation, Division of Natural Heritage, Springfield, Illinois. 18 pp.

Beltz, E. 1993. Distribution and status of the Illinois chorus frog, *Pseudacris streckeri illinoensis*, in Cass, Menard, Morgan, and Scott Counties of west-central Illinois. Unpublished report to Illinois Dept. Conservation, Division of Natural Heritage, Springfield, Illinois. 17 pp.

Brown, L. E. 1978. Subterranean feeding by the chorus frog *Pseudacris streckeri* (Anura: Hylidae). Herpetologica 34:212-216.

Brown, L. E. and J. R. Brown. 1973. Notes on breeding choruses of two anurans (*Scaphiopus holbrooki, Pseudacris streckeri*) in southern Illinois. Chicago Acad. Sci. Nat. Hist. Misc. 192:1-3.

Brown, L. E., H. O. Jackson, and J. R. Brown. 1972. Burrowing behavior of the chorus frog, *Pseudacris streckeri*. Herpetologica 28:325-328.

Brown, L. E., and D. B. Means. 1984. Fossorial behavior and ecology of the chorus frog *Pseudacris ornata*. Amphibia-Reptilia 5:261-273.

Brown, L. E. and G. B. Rose. 1988. Distribution, habitat, and calling season of the Illinois chorus frog (*Pseudacris streckeri illinoensis*) along the lower Illinois River. Ill. Nat. Hist. Surv. Biol. Notes 132:1-13.

Butterfield, B. P., W. E. Meshaka, and S. E. Trauth. 1989. Fecundity and egg mass size of the Illinois chorus frog, *Pseudacris streckeri illinoensis* (Hylidae), from northeastern Arkansas. Southwest. Nat. 34:556-557.

Conant, R., and J. T. Collins. 1991. A Field Guide to Reptiles and Amphibians [of] Eastern and Central North America, Third edition. Houghton Mifflin Co., Boston. 450 pp.

Dodd, C. K., Jr., G. E. Drewry, R. N. Nowak, J. M. Sheppard, and J. D. Williams. 1985. Endangered and threatened wildlife and plants; review of vertebrate wildlife; notice of review. Part III. U. S. Dept. Interior, Fish and Wildlife Serv. Federal Register 50:37958-37967.

Donnelly, M. A., and C. Guyer. 1994. Mark-recapture. In Heyer, W. R., M. A. Donnelly, R. W. McDiarmid, L.-A. C. Hayek, and M. S. Foster (eds.), Measuring and monitoring biological diversity standard methods for amphibians, pp. 183-200. Smithsonian Institution Press, Washington, D.C.

Gilbert, H. R. 1986. Geographic distribution: *Pseudacris streckeri illinoensis* (Illinois chorus frog). Herpetol. Rev. 17:65.

Herkert, J. R. 1992. Endangered and threatened species of Illinois: Status and distribution. Volume 2 - Animals. Illinois Endangered Species Protection Board, Springfield. 142 pp.

Holman, J. A., H. O. Jackson, and H. W. Hill. 1964. *Pseudacris streckeri illinoensis* from extreme southern Illinois. Herpetologica 20:205.

Morris, M. A. 1990. Ranges of amphibians and reptiles, pp. 52-77 *in* R. A. Brandon. Herpetology laboratory notebook. Kopies and More: Carbondale, Il.

Morris, M. A. and P. W. Smith. 1981. Endangered and threatened amphibians and reptiles, pp. 21-33 *in* M. L. Bowles, V. E. Diersing, J. E. Ebinger, and H. C. Schultz, eds. Endangered and threatened vertebrate animals and vascular plants of Illinois. Illinois Dept. of Conservation: Springfield.

Packard, G. C., J. K. Tucker, and L. D. Lohmiller. 1998. Distribution of Strecker's chorus frogs (*Pseudacris streckeri*) in relation to their tolerance for freezing. Journal of Herpetology 32:437-440.

Paukstis, G. L., and L. E. Brown. 1987. Evolution of the intercalary cartilage in chorus frogs, genus *Pseudacris* (Salientia: Hylidae). Brimleyana 13:55-61.

Paukstis, G. L., and L. E. Brown. 1991. Evolutionary trends in the morphology of the intercalary phalanx of anuran amphibians. Can. J. Zool. 69:1297-1301.

Smith, P. W. 1951. A new frog and a new turtle from the western Illinois sand prairies. Bull. Chicago Acad. Sci. 9:189-199.

Smith, P. W. 1961. The amphibians and reptiles of Illinois. Ill. Nat. Hist. Surv. Bull. 28:1-298.

Smith, P. W. 1966. *Pseudacris streckeri*. Cat. Am. Amphibians Reptiles 27.1-27.2.

Taubert, D. B., P. W. Shetley, D. P. Philipp, and T. Harrison. 1982. Breeding biology and distribution of the Illinois chorus frog (*Pseudacris streckeri illinoensis*) in Illinois. Illinois Dept. of Conservation: Springfield. 163 pp.

Tucker, J. K. 1995. Early post-transformational growth in the Illinois chorus frog (*Pseudacris streckeri illinoensis*). J. Herpetol. 29:314-316.

Tucker, J. K. 1997a. Fecundity in the Illinois chorus frog (*Pseudacris streckeri illinoensis*) from Madison County, Illinois. Trans. Illinois Acad. Sci. 90:167-170.

Tucker, J. K. 1997b. Description of newly transformed froglets of the Illinois chorus frog (*Pseudacris streckeri illinoensis*). Trans. Illinois Acad. Sci. 90:161-166.

Tucker, J. K. 1997c. Food habits of the fossorial frog *Pseudacris streckeri illinoensis*. Herpetol. Nat. Hist. 2:83-87.

Tucker, J. K. 1998. Status of the Illinois chorus frog (*Pseudacris streckeri illinoensis*) in Madison County, Illinois pp. 94-101 *In* M. J. Lannoo (ed.), Status and Conservation of Midwestern Amphibians, University of Iowa Press, Iowa City.

Tucker, J. K., and D. P. Philipp. 1993. Population status of the Illinois chorus frog (*Pseudacris streckeri illinoensis*) in Madison County, Illinois, with emphasis on the New Poag Road/FAP 413

interchange and FAP 413 wetland mitigation site. Unpublished report to Illinois Department of Transportation, Springfield, Illinois. 31 pp.

Tucker, J. K., and D. P. Philipp. 1994. Population status of the Illinois chorus frog (*Pseudacris streckeri illinoensis*) in Madison County, Illinois: Results of 1994 surveys. Unpublished report to Illinois Department of Transportation, Springfield, Illinois. 69 pp.

Tucker, J. K., and D. P. Philipp. 1995. Population status of the Illinois chorus frog (*Pseudacris streckeri illinoensis*) in Madison County, Illinois: Results of 1995 surveys. Unpublished report to Illinois Department of Transportation, Springfield, Illinois. 12 pp.

Tucker, J. K., and D. P. Philipp. 1996. Population status of the Illinois chorus frog (*Pseudacris streckeri illinoensis*) in Madison County, Illinois: Results of 1996 surveys. Unpublished report to Illinois Department of Transportation, Springfield, Illinois. 45 pp.

Tucker, J. K., J. B. Camerer, and J. B. Hatcher. 1995. Natural history note: *Pseudacris streckeri illinoensis* (Illinois Chorus Frog) Burrows. Herpetol. Rev. 26:32-33.